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ORIGINAL COMMUNICATIONS.

ARTICLE I.—*On the Treatment of Poisoned Wounds, by the Application of Cupping Glasses and the Sub-Cutaneous Infiltration of Solutions of Iodine*—By DANIEL BRAINARD, M. D., Prof. of Surgery in the Medical College at Chicago, Corresponding Member of the Societe de Chirurgie de Paris, etc., etc. (Being the Annual Address before the State Medical Society of Illinois, delivered June 4th, 1854, on leaving the chair as president of the society.)

GENTLEMEN OF THE SOCIETY,—

It is customary, on occasions like the present, to select as a topic for discourse some subject connected with the general interests of the profession, such as its history, its wants, its claims, or its duties. I hope to be pardoned for departing in some degree from this practice, and presenting before you a simple essay on a surgical subject. The reason for adopting this course is, a firm conviction that the first want, and greatest interest of the medical profession, is the improvement of medical science, and because I have made poisoned wounds, to which your attention is asked to-day, the subject of especial study, and entertain views concerning their treatment, which I believe to be both new and important.

The class of poisons to be considered is that, denominated by Orfila, septic, or putrid poisons. It embraces, among other substances, the venom of serpents, the woorara or American poison

used on arrows, putrid animal matter, as that inoculated in dissecting wounds, etc.

These substances possess the property, in common, of being innocuous, or little active when taken into the stomach; but causing the tissues to run rapidly into gangrene when they are placed on the surface of recent wounds, and of being more rapidly fatal when thrown into the blood vessels.

Christison and other toxicologists have not admitted the existence of septic poisons, but I think no one accustomed to witness the effects of the venom of serpents on a wound, could doubt the propriety of admitting such a division.

All rational views of the treatment of poisoning, date from the period when poisons were found to exist physically in the different organs of the body, and exert their influence on the solids and fluids by virtue of their peculiar properties. This discovery is due, mainly, to Orfila, and it is upon it that the practice is founded of using such means of treatment as are capable of neutralizing or diluting the poison, or causing it to be eliminated from the system in the excretions. In the case of mineral and vegetable poisons, chemical antidotes are useful, but in a limited degree, and only when the substance to be neutralized is still retained in the stomach. As soon as it has been absorbed, dilution and elimination are the only means of obviating its dangerous effects.

With regard to animal poisons, neither neutralization by chemical agents, nor dilution, nor elimination, has hitherto been successfully attempted. The means resorted to at the present time, are the excision or destruction, by caustic, of the part on which the poison has been inoculated, and the use of such means as are supposed to be capable of counteracting its effects.

My object in this address is, to show that the venom of serpents and the woorara may be neutralized after being introduced into the tissues; to show the manner in which this may be effected, and to prove the efficiency of the treatment by experiment before you.

Before proceeding to speak of this treatment, it may not be without use to cast a glance at some of the means reputed to possess efficiency against the bite of serpents, in order to show how slight are their claims to confidence.

Washing and sucking the wound, inasmuch as they have a tendency to remove the venom from its surface, are to some extent serviceable. Yet Fontana found them insufficient to prevent death, in birds bitten by the viper, (Traite sur le Venin de la Vipere etc. Florence, 1771, vol. 1, p. 106). Sugar and common salt, mentioned by Humboldt as the antidotes to the woorara used by the natives of South America, are without any effect, as Magendie has shown by experiment.

The strong mineral acids and aqua ammonia did not, in the experiments of Fontana, prevent the action of the venom of the viper when mixed with it before inoculation. Making incisions about the wound was found by Fontana to hasten death, after the bite of the viper. Nitrate of silver mixed with a solution of woorara, does not prevent its fatal effects. Mixing the venom of serpents, or the woorara, with alcohol or oil of turpentine, preserves them, and makes them more active than when they are mixed with water. In cases where excision of the part, or its destruction by caustic, or the actual cautery have been resorted to, the result has usually been fatal. The use of cups upon the part, and ligatures about the member, are the only means known, whose efficiency against the venom of serpents has been proved by experiment.

Their beneficial action results from their power of retarding absorption, thus causing the poison to enter the circulation slowly. Pennock has shown that this is not produced by the removal of the pressure of the atmosphere, as Barry supposed, but by the pressure of the edge of the cup, which interrupts the circulation in the vessels of the part.*

Alcohol taken to intoxication has at the present time the reputation of counteracting the effects of the venom of several species of serpents. The evidence in its favor is scarcely sufficient to justify the confidence reposed in it, as the following facts will show:

1. When mixed with alcohol the venom is rapidly fatal, if inoculated.

2. Alcohol injected into the tissues, or introduced into the stomach of birds, or of small animals which have been bitten,

* American Journal of the Medical Science, vol. ii. 1828.

hastens death. This circumstance is not conclusive, as alcohol is of itself a poison for them.

3. Persons bitten by rattle-snakes when in a state of intoxication by alcohol are not, on that account, secure. I have authentic information of four cases in which the bite of that snake proved rapidly fatal on intoxicated persons. Another may be found related in the American Journal of the Medical Sciences, Vol, 8, 1831.

As not more than one in ten of the wounds made by the most venomous serpents proves fatal, a case of failure of a remedy is sufficient to counterbalance many cases of its success.

As the woorara is one of the poisons with which I have experimented, and the one which I propose to use to-day, it may be well, before going further, to say a few words on the subject of the nature of this substance. As usually met with, the kind which is brought from South America is contained in small gourds over the internal surface of which it is spread. On being detached it presents a dark color, has a resinous fracture, a bitter taste, is readily mixed with water, but imperfectly dissolved by it. Its appearance is the same when mixed with alcohol; but both these fluids dissolve the active principle of it. The solution is neither acid nor alkaline. If the quantity of water used be small, the mixture has a ropy, tenacious consistence. The solution is coagulated by the nitrate of silver, and by the solution of iodine and iodide of potash in distilled water, and, when treated with the latter solution, neither the part coagulated nor the fluid expressed from it retains its poisonous quality. It does not effervesce with acids. Its aqueous solution is not coagulated by heat, and boiling does not impair its activity.

The active principle has generally been considered as analagous to strychnine,* and Pereira states that the strychnos toxifera yields the basis of it.

Nearly all recent authors have copied the account of its manufacture given by Humboldt,† who enters into detail, and says

* Element of Materia Medica, Vol. II., p. 364.

† Voyage to the Equinoxial Region of of the New Continent, Vol. II., pp. 547 to 556.

it is made from the bark of the root of a species of *liane*, called by the natives of the banks of the Amazon, Bejuco de Mavacure.

"The chemical analysis of the woorara has been performed by Boussingault and Roulin, (Annales de Chimie, Sept. 1828,) who found in it a bitter principle, *very different from the strychnia* acetic acid, gum, red coloring matter, salts, etc.*

De la Condamine states that it is an extract made by heat from the juice of divers plants, about thirty in number, and that the *liane* is one of them.

Such was the state of our knowledge on this subject, when in 1850 Messrs. Pelouze and Bernard read a note at the Academy of Sciences on the subject.

Mr. Goudot, who furnished them with a specimen of the poison, confirms in general the account of Hamboldt, as to the manner of its preparation from the juice of the *liane;* but he adds the important statement that "before the extract is quite dry they drop into it some drops of the venom of serpents collected from the vesicles of the most venomous species." Messrs. Pelouze and Bernard conclude that "the woorara acts upon animals in the manner of a venom."‡

From the discrepancy of these different accounts, it might be inferred that the various poisons prepared by the Indians of the Amazon and the Orinoco differ essentially in their properties; and Humboldt states that such is the case. There are, however, two facts stated by Humboldt himself which go to favor the opinion of Bernard and Pelouze. The first is that the juice of the *liane* before concentration is inocuous. The other is that "the Indians who have been wounded by poisoned arrows in war described to us the symptoms as entirely like those which are observed from the bite of serpents."

It is not probable that a juice from which a poison of such extraordinary activity is manufactured would be itself without power; and it is impossible to confound the effects of strychnia and those of the venom of serpents when applied to a wound on

* Dict. de Medicine, Tome IX., p. 483.

‡ Comptes Rendus de l'Academie des Sciences Seance Du, October 14, 1850.

the human subject. For myself, having made more than a hundred experiments with the woorara, I entertain but little doubt that the active principle of the specimens which I have made use of is the poison of serpents preserved in extractive and gummy matter. Those specimens were two. The first I believe to be a part of the same as that furnished to Messrs. Bernard and Pelouze by M. Goudot, as it was procured for Dr. J. W. Green and myself from M. Flourens at the Garden of Plants, by the Prince Charles Bonaparte. The other, which came from the Amazon, was furnished me by Dr. David Green, of New York. Their appearance and action were identical in every respect.

My reasons for believing its active principle to be the venom of serpents are these:

1. Its effects on birds and animals are strikingly like those produced by the venom of the rattlesnake; and in many cases no difference can be perceived between them.

2. These effects are entirely unlike those produced by the vegetable alkaloids.

3. Iodine neutralizes it as it does the venom of serpents, but has no such effect on vegetable alkaloids.

4. It is, like the venom of serpents, innocuous when taken into the stomach, except, perhaps, when used in very large quantities, or in circumstances very peculiar. This is not the case with any known vegetable poison.

5. It is well known that the poison used by the *North* American Indians for their arrows is that of the rattlesnake. I have learned this from such varied sources as not to leave any doubt on the subject. My inquiries have related to the Indians of California, New Mexico, and Texas, and been directed to medical officers of the army and intelligent travellers. The answers have never varied. The art of poisoning weapons is no longer a secret among them, but is often employed by those whites who adopt their customs. Dr. George Johnson, of St. Louis, who has traveled extensively on the Rio Grande, gave most accurate and valuable information concerning the habits of several Indian tribes in this respect. He states that there is a variety of rattlesnake on the Rio Grande, whose poison vesicle is much developed, and

forms a prominent projection. This species is much sought for, on account of the quantity of virus contained in the sac.

I am, therefore, justified in stating that the poison used for arrows is, *in some instances*, the virus of serpents. There is great reason for believing that the process of preparing it is, as far as possible, kept a secret, except in what relates to the preparation of the juice of the plants destined to serve as a vehicle for the preservation of the venom.

If I am mistaken in this point, and the woorara should be found to contain some poisonous vegetable principle hitherto unknown, it will not invalidate my conclusion in regard to the effect of iodine upon it. It would only extend the application of this substance to the treatment of two kinds of poisoned wounds instead of restricting it to but one.

Having disposed of this point, I come now to the method of treatment which I propose for wounds poisoned by the woorara.

1st. It consists in the application of cups upon the part, or of ligatures around the member wounded, so as to arrest absorption.

2d. In injecting or infiltrating into the subcutaneous tissue the solution used as antidote.

The cups should be applied for a short time before the infiltration is employed, so as to fill the tissues with fluids, and prevent the injected liquid from producing abscess by mechanical injury. They should be allowed to remain on from five to ten minutes after the infiltration has been effected, in order to allow time for the antidote to come in contact with the poison before the latter has entered the circulation. In case much swelling and effusion have taken place before treatment can be applied, the application of cups would be unnecessary, as the fluid injected would in that case pass freely through the tissues without it. The strength of the solution should depend on the state of the parts, and the extent to which it is desired to disseminate it in the tissues. For a recent wound ten grains of iodine, and thrice that quantity of iodide of potassium to the ounce of distilled water should be employed. It should be put upon the wound, and the tissues filled with it for an inch around. When the swelling is already extensive, one-half or one-fourth the above strength will suffice; and

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the solution should, in that case, be disseminated as extensively as possible through the part affected, by introducing it, if necessary, at several different points. In a recent case I would advise one drachm of the solution to be injected.

In order to perform the injection or the infiltration perfectly, it is requisite to have cups to fit the inequalities of surface of the different parts of the trunk and members. Although ligatures can be made to arrest the circulation, and consequently the absorption, and fill the tissues with fluids, they do this less rapidly and less perfectly than cupping glasses. To perform the infiltration, small trochars like the exploring trochar are required, or they may be made still finer, (see plate 2, fig. 5 and 6). To the canula of the trochar a small syringe, like that called Anel's, should be adapted. (Plate 2, fig 4.) After the trochar has been introduced, and the stylet withdrawn, the syringe should be adapted to the canula; while the injection is gently pressed in, the cupping glass should be gradually exhausted. This is the method I advise on the human subject. When it is desired to employ it for experiment, a small syringe, the piston of which moves with a screw of which half a turn presses out a drop, and of which the point is also adapted to the canula, should be employed to insert the poison in the tissues. (See plate 2, fig. 7.)

I was led to the belief that iodine is the proper application to the snake bite, by experiment. Selecting salts which had not been used by others, I found the selection I have recommended, to be the only one which prevented the fatal effects of the poison, without producing an eschar. The solution of the iodide of potassium alone, has no effect as an antidote.

I am aware that the infiltration of the solution into the tissues is the part of the treatment which will be longest in receiving the assent of physicians, and the most difficult to introduce into general practice. Nevertheless, it is easy to understand, a priori, the reason and the necessity for so doing. In order to neutralize a poison once introduced into the system, it is essential that the antidote should be also introduced, and placed there where the poison exists, and in contact with it. Now, in case of an inoculated poison, any application which is confined to the external surface

undertaken with the view of finding the antidote to the venom of the crotalus; and of testing the effect of such antidote, when thrown into the tissues of the animal body where the venom has been inoculated. They have furnished results, not before noticed by other observers, which are deemed of sufficient importance to be placed first in order.

The new facts observed are—

1. A spasmodic action of the whole muscular system, but more particularly of the larynx.

2. A certain change of the blood globules.

The antidote recommended is, the solution of iodine and iodide of potassium in water, applied upon the wound. and infiltrated into the tissues of the part affected.

As a means of preventing absorption, and rendering the action of the antidote more effectual, the use of cupping-glasses is recommended.

The serpent employed in these experiments was the massasagua, or prairie rattlesnake, the bite of which is deemed less dangerous than that of some other varieties. This probably does not arise from a difference in the venom, but from the snake being smaller and not sufficiently strong to make a deep wound. That such is the case, is proved by the fact that animals and persons bitten on the cutaneous surface, rarely die of the wound; but when bitten on the mucous surface, death is generally and speedily the result. In birds, also, whose skin is tender, the bite is uniformly and quickly fatal.

My experiments were mostly made on the domestic pigeon. The rapidity with which the poison affects it, and the size and form of its blood globules, render it peculiarly adapted for this purpose When freely bitten, the birds generally live from five minutes to two and a half hours, according to the extent of the wound and the degree of concentration of the poison. There is great difficulty in experiments with this venom, in arriving at the degree of accuracy required in all such cases. This difficulty arises from the impossibility of measuring accurately the quantity used, the strength of each specimen being liable to vary from that of others. Not only those procured from different

species, but even specimens procured from the same species, and the same serpent at different periods, differ in strength. The season, the temperature, the food of the serpent, the frequency of discharge, and other causes difficult to appreciate, render the bite of any serpent most uncertain in its effects.

In order to obviate, as far as possible, the causes of uncertainty, a serpent was not allowed to bite more than three times the same day. One of the pigeons bitten was left without treatment, and if this did not die, all experiments with that serpent on that day were left out of consideration.

Effects of the Poison.—As an example of the effects of the poison, I transcribe from the record of experiments the following case, in which, from death occurring slowly, the changes could be carefully noted:

Friday, September 1, 1853.—A pigeon plucked under the wing was bitten at that point by a serpent. In fifteen minutes the wound and skin for half an inch around it were of a blue color. Effusion of serum had raised the skin, and separated it from the tissues beneath. At this time, slight spasmodic twitching of the fasciculi of the pectoral muscle beneath the bite was observed.

In twenty-two minutes this spasmodic action was greatly increased, and all the muscles, those of respiration especially, were affected with a tremulous movement, which passed off and recurred in paroxysms.

At this time the movements of the larynx in expanding and contracting were found to be much restrained. This organ being in full view in the pigeon when the mouth is opened, may be seen expanding during each inspiration, contracting after each expiration, and closing instantly and perfectly if it be touched, or if an effort be made to swallow.

In this case these movements were restrained, becoming more so as the effects of the poison increased. In thirty minutes there was difficulty of standing, the bird was gasping for breath, the mouth open, the eyes closed, the respiration spasmodic. At this time, the larynx was still more contracted, and the inspirations were at times accompanied by a sibilant sound.

In forty minutes, the bird was unable to stand, the respiration more irregular, the larynx more contracted. On being handled, this bird still moved its wings, but the legs were paralyzed.

It died at sixty-one minutes, the larynx being almost entirely closed for ten minutes before death. Observations on twelve birds which died, did not in any case show symptoms essentially varying from these, except in the greater rapidity or slowness of their occurrence. In some the spasm of the larynx was less, in others more decided. In one the larynx was found to dilate fully and spasmodically several times in succession, and then close perfectly so as apparently to cause the death of the bird.

The vision and the hearing were apparently unaffected until an advanced stage of the action of the venom.

The birds uniformly lose the use of the posterior extremities first, and one which recovered did not regain the power of using them for two days.

Effects noticed in the parts bitten.—Almost instantly, in rapid cases, the wound turns blue. This discoloration spreads rapidly, principally in the direction of the vessels leading to the heart. On laying open the wound, the tissues are found discolored, brown, infiltrated with serum, presenting all the appearances of a wound in approaching gangrene. If the wound be on an extremity gangrene actually occurs.

State of the blood.—When death is delayed, the blood found in the cavities of the heart and in the great vessels, is of a dark color, and not coagulated. When death occurs rapidly, the blood is found coagulated, but less firmly than in the natural state.

Felix Fontana states that the venom of the viper causes the blood to coagulate in the vessels and the cavities of the heart. Much as I admire the genius and patience of Fontana, who, notwithstanding his profession (he was an ecclesiastic), devoted himself to researches concerning a subject so repulsive as that of experimenting with vipers, and made over six thousand experiments with them, I think it is still permitted to doubt whether in this respect he is not mistaken. The viper is nearly allied to the crotalophorus, as this species of serpent is to the crotalus, and there is every reason to believe that in regard to the venom

of these serpents, there exists only the difference which results from quantity and various degrees of activity. I should desire a new series of observations directed to the subject, before admitting that the venom of the viper produces effects on the blood directly the reverse of those resulting from the venom of the rattlesnake.

There is, probably, no disease or state of the system in which the fibrin of the blood is reduced to as small a quantity as it is in persons or animals bitten by these serpents.

As a consequence probably of this, ecchymosis occurs, and the member bitten, and sometimes the whole cutaneous surface, is covered with spots like those which are observed in petechiæ hemorrhagicæ. If death does not result in a few hours, hemorrhage often takes place. It may occur from the mucous surfaces, from ulcers, slight wounds, and from the bite itself. In the case of a patient admitted into the Illinois General Hospital on account of a bite, Dr. Johnson was unable to detect any appearances of fibrin in the blood which came from the mouth. In a dog bitten on the abdomen, a hemorrhage occurred, the next day from a slight punctured wound, which was near proving fatal.

Microscopic examination of the blood.—I have already stated that in extreme cases, the fibrin is entirely wanting, or at least is in so small quantity as not to be perceived by the microscope. The globules, the only other part of the blood subject to microscopic examinations, are in the pigeon more or less altered.

The venom having been extracted from a serpent and mixed with a few drops of distilled water, the mixture was added to the blood of a pigeon, under the focus of the microscope. As fast as the globules were reached by the venom they changed their form and assumed the appearance, shown in plate ii, fig. 3, of the accompanying paper.

A pigeon which had died from the bite of a rattlesnake, was examined fifteen hours after death. There was no appearance of putrefaction. Fig. 2, plate ii represents the appearance of the globules of blood taken from the vessels of the head.

I have examined them in numerous other instances, with the aid of my friends, Drs. H. A. Johnson and J. C. Morfit. In some of them we found, immediately after death, the blood of the great

vessels much altered. It was not coagulated. Some of the globules were indented, others flattened on the side so as to be shield-shaped, others assumed a dumb bell form. In these cases many granules, resembling the nuclei of the globules, were noticed.

In the blood taken from the wound of a bird dead of the bite, Dr. Johnson found much granular matter and few globules. In that taken from the cellular tissue, at a certain distance from the bite, the globules were found thickened in their transverse, and shortened in their longest diameter. This latter change resembles that produced by a solution of sugar, and it did not result probably from the direct action of the poison, but from the globules having been macerated for some time in the effused serum.

When some hours had elapsed after the bite, before death, and the local effect was considerable, the blood taken from the vicinity generally showed an unusual number of white globules, which manifested a tendency to aggregation.

Treatment of the bite.—There is no point of practice in surgery which is less settled than the treatment of the bite of serpents. For reasons already alluded to, the wound inflicted even by the most poisonous species, such as the cobra de capello and the crotalus, are not commonly fatal. Hence, many inert remedies and others calculated to injure, have received the credit of curing, and come into popular use. Without, at the present time, going into this subject, it may suffice to state that the efficiency of no method has heretofore been established by direct experiment, if we except the application of cupping glasses. These, made use of as soon as the bite is inflicted, and continued for some time, have the effect of retarding the action of the poison. In cases where the dose is barely sufficient to kill, delaying its action neutralizes its effect, by causing it to be taken into the system in small doses.

Tracheotomy.—Bearing in mind the experiments of Dr. Marshal Hall, on dogs poisoned by strychnia, one of which was saved by tracheotomy, I no sooner observed that spasm of the larynx was one of the effects of the poison of the serpent than the operation presented itself as a possible means of relief. It was performed upon pigeons six times, in each case the effects were so far ad-

vanced as to show an undoubted tendency to a fatal termination. In no case did it prevent death, yet it must be admitted that in some of them it rendered the respiration regular and easy and evidently prolonged life.

Treatment with the solution of iodine.— In experimenting with different medicinal solutions, while searching an antidote to the effects of the bite of the rattlesnake, I was led to the belief that the solution of iodine and iodide of potassium in water, exercises a much greater influence over it than any other substance, excepting some of the most powerful caustics.

I extracted the virus from the vesicle of a serpent; it stood in a drop on the surface of a spoon. Having made superficial wounds on the breast of the two pigeons, I put the venom on them, dividing it between them, as nearly as possible, equally. On one of the wounds a few drops of solution of iodine was placed. It was of the strength of ten grains of iodine and thirty grains of iodide of potassium to the ounce of distilled water.

These birds were not closely watched, but at the end of six hours the one treated with the iodine was quite well, and the other was dead.

I repeated this experiment with much care, and having a larger quantity of poison used four pigeons. Of the two not treated, one lived two and the other three hours, those to which the solution of iodine was applied lived, and did not appear to be affected.

It is well known that wounds thus inoculated are much less rapidly fatal than the bite itself of the serpent. I therefore applied the solution upon the breast of a pigeon where a bite had been inflicted, but it did not prevent death from taking place in the usual time.

When we consider that the fangs of this serpent are capable of penetrating the tender skin and tissues of a pigeon at least half an inch, and are so constructed as to deposit the venom there, that the part of it which is left upon the surface is without effect. that an application to the surface can but slightly penetrate the wound, it becomes obvious that an antidote applied in that manner cannot reach the virus, and must of necessity remain without effect upon it. So far as the virus is concerned, it is the same as if the solution had remained in the bottle.

Under these circumstances, I thought of a method of treatment which I had made use of with success in some cases of erysipelas and œdema, viz: infiltrating the solution into the tissues. This operation is performed as follows:

A pigeon being prepared, and bitten as before directed, a cupping glass is immediately applied over the wound. A fine trochar being then passed beneath it and under the skin to the seat of the wound, the stylet is withdrawn and the solution of iodine injected through the canula into the tissues. The cup is then continued upon the part for from five to ten minutes.

Of ten pigeons treated in this manner, there died five, recovered five. Average time of death, two hours and fifty-two minutes. Of ten birds bitten, without treatment, all died, average time of death, eighty-eight minutes. Of those which died after being treated with iodine, two had the wound so situated as not to be covered by the cupping-glass, and in all of them the solution used was too weak, being of but half the strength required and of that before directed to be used.

I also tried cupping alone, and the injection of a solution of the lact ferri, eight grains to the ounce of distilled water, and distilled water alone. Dr. Morfit, who was kind enough to assist me in my experiments, tried liquor potassa, a solution of bi carb. soda, tr. arnica, and a solution of ammonia in water.

The cupping alone has the uniform effect of retarding the action of the poison and prolonging life. In cases where the dose of poison is barely sufficient to kill without any treatment, this of itself is capable of preventing death. This was the result obtained by Magendie, and it is not a little surprising that a means of treatment of such certain efficiency should be so seldom resorted to in practice.

On the other hand, birds treated with the aqua ammonia died quickly. Fontana found that aqua ammonia, applied to a viper bite, hastened death. Yet this is the most popular application for serpent bite.

In regard to the other fluids tried, it is sufficient to say, in general, that none of them had an effect, except those capable of producing an eschar. Soda and potass do this, unless very

weak. Fontana, who tried the mineral acids, and almost every imaginable solution in his experiments with the viper, found the caustic potash alone capable of preventing its effects.

The result of my experiments, taken in connection with those made by others, is, that up to the present time, no substance or solution has been found capable of preventing the fatal effects of the rattlesnake bite (unless destroying by caustic or excising the tissues of the part) excepting the solution of iodine. This, within certain limits, is capable of neutralizing it.

In order to guard against error, it should be stated that, in experimenting with birds, the separation of the skin by injecting even distilled water and applying cupping-glasses, is liable to cause the skin to fall off in scales. When the skin is not extensively separated, the solution recommended does not produce an eschar. The effects of iodine solutions on the tissues, since the publication of Velpeau's work on the subject, are so well understood that it is unnecessary to dwell further on this point.*

The effect of solutions of iodine, infiltrated into the tissues around the bite of the rattlesnake, is to prevent their discoloration and preserve the natural texture and color of the parts. Even when it does not prevent death from occurring, it still has this effect in a great degree.

The deductions which I think may legitimately be made from the foregoing facts, are—

1. The venom of the crotalus produces spasm of all the muscles —most marked in the muscles of respiration.

2. This venom produces a peculiar change of the blood globules, which consists of alteration of form and disintegration.

3. If death is delayed, it deprives the blood of its fibrine.

4. The solution of iodine and iodide of potassium, in the proportion of ten grains of the former and thirty of the latter to the ounce of distilled water, is, within certain limits, an antidote to the venom of the rattlesnake.

5. When the venom is deeply inserted, or when it has been

* Des Injections Medicamenteuses dans les cavites closes. Par A. A. Velpeau. Paris, 1846.

absorbed, the antidote, to be effectual, must be infiltrated into the tissues.

6. This infiltration can be performed without causing loss of substance, or producing either eschar or suppuration.

NOTE.—I am under great obligation to Drs. H. A. Johnson and J. C. Morfit, of Chicago, for aid in conducting experiments with serpents, making the microscopic observations and drawing the figures of the plates.

I am also deeply indebted to my young friend, Robert Kennicott, for procuring for me as many serpents as I needed for my experiments, and for many valuable facts in relation to the effects of the poison.

Case of Acute Opthalmitis with Suppuration of the Globe of the Eye.. By S. W. THOMPSON, M. D.

E. O. about the middle of February, 1854, came to me and requested my opinion upon an extensive opacity of the cornea of the right eye. He stated that some twelve or fourteen weeks previously, he was attacked with common sore eyes,—"Conjunctivitis."—That after the lapse of six weeks, the treatment he had undergone had done him no good, and the Cornea *then* ulcerated, and it was four weeks longer ere he could leave his room.

At the expiration of this period—"ten weeks in all"—the ulcerated surface healed, since which time his sight is entirely gone in the affected organ. He says there is no particular pain in the eye, but a sense of uneasiness and sometimes of weight. The cicatrix extended almost entirely across the cornea laterally, leaving a small portion of the superior surface apparently clear.

I told him I could give no encouragement as to the chance of its removal, nor even as to the partial recovery of his sight. I based my opinion, regarding the latter point, upon the probabilities of some of the internal structures of the eye being irreparably injured from the long continuance of the previous disease, and the still-existing sense of weight and uneasiness in the organ. I further told him, however, that it might be worth his while to pursue a proper and systematic course of treatment, to endeavor to remove the opacity, partially at least, before the cicatrix became hardened and beyond hope. He however left, without deciding to follow the advice. Drs. Whitlock and Turney saw the case at the same time, and concurred in the opinion I had expressed.

During the night of the 2d of March following, I was called to see him. He was suffering excruciating pain in the affected eye, and along the track of the supra orbital nerve of the same side. The whole eye-ball was greatly increased in size, protruding to a very considerable extent, and causing complete eversion of the inferior palpebra. Dr. Turney had been to see him twice previous to this date, and since this attack commenced, which was about three days ago The bowels were costive, pulse weak but rather quick. Skin cool, but dry; urine high colored. and rather scanty; severe headache. The surface of the eye-ball was of a purplish red color. The superior palpebra was pushed up by the protruding organ, and presented a dark purplish, œdematous appearance. Profuse suppuration was going on from the whole exposed conjunctival surface. Cornea already sloughing. Dr. Turney had cupped him freely on the right temple, and had given mercurials to the extent of ptyalism.

I immediately ordered a hop poultice, and while this was being prepared, I made transverse scarifications upon the eye-ball, and then bathed the eye with warm water to encourage bleeding. Gave morphia ℥ gr , Dover's powder x. gr., to give him ease, and restore the cutaneous secretion. In the morning I found him easier, but the swelling of the eye-ball was not at all lessened. I ordered castor oil and turpentine, to evacuate the bowels; left tart. antim., to keep down vascular excitement, and morphia and Dover's powders, to quiet pain and nervous excitability; continue the warm water bathing, and the application of the hop poultice.

I was of the opinion that his eye would burst as I believed there was matter contained within ; I therefore advised him to submit to have it punctured through the already sloughing cornea, and thus evacuate the purulent accumulation. This, however, he objected to.

On the following day I saw him again. Condition not much changed. The surface of the eye-ball was lessened, but the everted eyelid was not reduced in thickness. Bowels open. Size of eye-ball not at all reduced. He could rest only whilst under the influence of the opiates. I still felt fearful the eye would burst, yet I could not enforce the measure, previously advised, to

puncture, owing to the entire absence of all those symptoms which serve as landmarks to guide us in our diagnosis of the formation of matter. There had been no shiverings, no rigors, no night sweats, no sudden remission of pain and afterwards its recurrence. But I felt satisfied that during the attack he had previously suffered under, there had been a small accumulation of purulent fluid, which, when the eye was to all appearances free from disease, had been gradually increasing and causing the sense of weight and uneasiness.

I scarified the eye-ball again, as also the everted palpebra, and ordered a few drops of a solution of argenti nitras x. gr., aqua ʒj, to be introduced upon the schlerotic surface, and then to be immediately followed by bathing with warm water, as before. I used the argenti nitras in this form, because in several previous cases I had found it to answer better than anything else in reducing vascular engorgement. This plan of treatment, with such modifications as the case required, was continued for several days; I occasionally used the solid nitrate in place of the solution, wherever there was a disposition to unhealthy granulations upon the exposed conjunctival surface. He continued to improve in every respect, except the size of the eye-ball which continued as great as before. I now, therefore, told the patient he must submit to have it punctured, or else there would ensue a still greater disorganization of the eye than had already taken place. The anterior lamina of the cornea were entirely gone. There had been no symptoms during this attack, indicating the formation of pus, although at the latter part of the previous illness, he now tells me, he had shiverings, night sweats, &c., to a slight degree.

I accordingly introduced a narrow bistury through the remaining portion of the cornea, completely into the vitreous humor: this was followed by an escape of a sanguine purulent fluid. From that time he rapidly convalesced, and with much less sinking of the organ into the orbit than I anticipated, considering the length of time that elapsed for disorganization of the internal structures of the eye to take place, before the purulent secretion was evacuated.

I have given but an outline of the treatment, omitting the details other than such as I wished more particularly to mention. I might

have used cups to the temples, but in their place I applied a blister behind the ear, and kept it open with stimulating dressings. I preferred this to cups because I considered the chief mischief was taking place in deeper seated textures than those to be reached by local depletion, and the derivative action of a blister could be kept up for a greater length of time than that of cupping. I am well aware that blisters in the acute stage of an inflammation are usually condemned by authorities; but as derivatives and counter irritants in opthalmia, I consider them invaluable, provided they are kept open until the inflammatory action is subdued; and in a case like this, where there exists no febrile action, they are doubly indicated. I prefer to apply them, in most cases, behind the ear, instead of the temple. You will remark here that I have used scarifications.

This, I am aware, is in opposition to the advice of very high authorities. Beer, Laurence, S. Cooper, and many others condemn them in the acute stage; but cases will sometimes occur in which we are constrained to fall back entirely upon our own judgment, even in violation of the general rules given us. So I considered it in this instance. Again, in regard to the use of the argenti nitras. I know this practice is condemned also in the acute stage; but, I am inclined to think, rather from theoretical than practical reasons; and I must confess that, so far as I may be allowed to judge from my own very limited experience, I know of no remedy which, under certain circumstances, at certain times, has such a powerful controlling effect over conjunctival inflammation as has this article, either in substance or solution. I do not limit its use to the sub-acute or chronic stages of the inflammatory process, nor to those cases alone in which there is mere redness or inflammation without much swelling or chemosis. The stage of inflammation alone does not govern me: it must be combined with other reasons for or against its use, ere I either use or discard it. Its application usually causes pretty severe pain at the moment; but this is soon relieved by warm bathing. The frequency of its repetition, as well as the strength of the solution, I judge of in each particular case.

BOOK NOTICES.

Observations on the Asiatic Cholera as it appeared in Cincinnati in the years 1849 *and* 1850. By THOS. CARROLL, M.D. Reprinted from the Western Lancet for June, 1854.

THIS is a monograph of 75 pages, giving a somewhat detailed account of the appearance, progress, and treatment of epidemic cholera in Cincinnati during the years 1849—50. It is very well written, and contains many facts in relation to the progress and results of the disease which are both interesting and valuable. The author is a firm believer in the contagiousness of the disease, and seems to adopt the popular idea that it originated in Asia and actually travelled (or its efficient cause) from thence across Europe and the Atlantic to America. He refuses to admit any valid or practical distinction between infection and contagion. We do not perceive that Dr. Carroll advances anything new in relation either to the pathology or treatment of Cholera. His views of the latter seem to us generally judicious, though he uses *brandy* much more than we think necessary or beneficial. There is probably no one remedy which has been so universally tried in the treatment of Cholera, as "pure brandy," so-called. We have studied its effects carefully, and are so well satisfied that it is entirely useless, if not positively injurious, in the great majority of cases, that it has been almost entirely discarded from our practice during the last three epidemics through which we have passed. As stimulants to support the circulation and temperature of the system, alcoholic drinks are much less efficient than tea and coffee, while their secondary effects on the blood and tissues are positively injurious.

The remedies on which Dr. Carroll chiefly relies are, in the

first stage, alteratives and tonics; and in the second or active stage, calomel and opium, given in small and frequently repeated doses. He prefers giving one or two grains of calomel, with from the tenth to the twentieth of a grain of opium, every five or ten minutes, rather than larger doses at longer intervals. In this he follows pretty closely the plan of Dr. Ayres of England.

D.

Transactions of the Medical Association of Southern-Central New York, at the Eighth Annual Meeting, held at Homer, June 4, 1851. From the Society.

The Association of Southern-Central New York, embraces many members with whom we are personally acquainted: and we are glad to see by their annual volume of Transactions that they are not only prospering in, but also zealously laboring to improve their profession. The number of Transactions before us contains 120 pages, filled with the following articles, viz, The "President's Address," "Opium and Sulphate of Quinine as Remedial Agents" "An Essay on Medical Education." "Circulation of the Vital Fluids in Animals." "Sub acute Pleurisy." "An Essay on the Depraved General Health sometimes occurring before Parturition, and its consequences," "Hypochondriasis terminating in death." "A case of Cyranche Trachealis, complicated with inflammation and ulceration of the Soft Palate." "Report of a case of Puerpural Convulsions." "Traumatic Phlebitis." "Sloughing of the Caput Coli," "Hypertrophy of the Heart, with Dilitation." "Cases of Typhoid Fever." "Report of Committee on Surgery of Chemung County," "Surgical Cases, by Dr. P. B Brooks, of Binghamton," "Report of the Committee on Endemics and Epidemics of Tompkins County," and the Proceedings of the Society.

The first of these papers is a well written address by Dr F Hyde, of Cortlandville, on the importance of a General Study of Anatomy and Physiology. The second paper is a short essay on the remedial uses of Opium and Quinine. The author presents no new views or important facts. The paper is chiefly characterised by an almost indiscriminate recommendation of Opium and Quinine in the treatment of inflammatory as well as febrile affections.

It is written by Dr. Nivison of Hector. N Y The third paper, on Medical Education, is from the pen of Dr. Daniel Holmes of Smithfield. Pa It is a well written Essay, and for the most part inculcates sound doctrines For improving the education of the profession, Dr. Holmes urges the practical adoption of the following propositions, viz :

"First. That there should be a more thorough preliminary education. Second That the term of private office instructions be more thorough and extended: and third. An extended term of medical lectures and that the colleges be more rigid in receiving and graduating students"

These are good propositions—the same indeed that have been urged by the American Medical Association from the day of its organization to the present time. But how shall they be realized in practice? It is easy to meet in Conventions and Associations and resolve, but who carries out the resolve in every day practical life? Does Dr Holmes himself always do it? We fear not, for in this same address he speaks of a young man who applied to him, whose "*preliminary education was very limited*," and yet he received him as a student and for four or five months continued to help him to gain admission into the profession And yet he blames some school for receiving and graduating that same student.

We recollect the first young man that ever applied for admission into our office as a student On examination we found him destitute of a competent knowledge of the most common branches of education We refused to receive him He went directly to a neighboring practitioner of age and experience and gained an easy admission to his office as a pupil. Yet that practitioner was a man of high standing, and is now a good member of the same Association to whom Dr. Holmes directed his address.

The truth is there is a great deficiency in the feeling of *personal* responsibility on the part of each individual member of the profession; and until this deficiency is supplied—until the great mass of the profession are made to feel personally a keen sense of responsibility in reference to everything pertaining to the introduction of students into the profession, formal resolutions will remain as they have been, little better than idle forms.

We had intended to notice some of the other papers in this volume, especially that on "Sub-acute Pleurisy," by Dr. Henry S. West, of Binghamton; but we have only room to commend it as a well written and valuable paper. D.

On Diseases of the Liver. By GEORGE BUDD, M.D., F.R.S., Professsor of Medicine in King's College, London, and Fellow of Cain's College, Cambridge. Second American, from the last and improved London Edition. With colored plates and Wood Cuts.—Philadelphia, Blanchard and Lea 1853.

THIS book has been before the medical public several years, and its value is consequently well known. It is one of those practical treatises on the functions and diseases of a particular organ, which embraces the whole subject in detail; and hence it should find a place in the library of every practising physician. It is an octavo volume of 468 pages; and we would especially commend it to the readers of the Journal as a book of practical value. D.

For sale at D. B. Cooke's, Chicago, Ill.

Hand-Book of Chemistry. Theoretical, Practical, and Technical. By F. A. ABEL, Professor of Chemistry at the Royal Military Academy, Woolwich, and Assistant Teacher of Chemistry at St. Bartholomew's Hospital; and C. L. BLOXAM, formerly First Assistant to the Royal College of Chemistry. With a Preface, by Dr. HOFFMAN; and numerous Illustrations on Wood.—Philadelphia: Blanchard and Lea. 1854.

THIS is a volume of 680 pages; embracing, besides an elementary treatise on chemistry, and an account of the various elementary bodies, detailed instruction in the various modes of analysis and other chemical manipulations. To the student who wishes to make himself familiar with all the details of practical chemistry, we should think the work one of great value Its contents, however, do not admit of a brief analysis: and we must, therefore, content ourselves with this simple statement in reference to their nature and value. D.

Lectures on Surgical Pathology. Delivered at the Royal College of Surgeons of England. By JAMES PAGET, F.R.S., &c. Philadelphia: Lindsay and Blakeston. 1854.

THE history of surgery illustrates the value of science in elevating art. The few simple operations performed in the earlier ages were attended with much danger, from the fact that anatomy as a science was imperfectly understood. In addition to this, the functions of parts, the mode of their growth, the condition of their life, and the laws of their repair, were almost unknown. To the industry of the last and the first of the present century we are indebted for the most careful studies and the most minute descriptions in human anatomy. The first obstacle has been removed. To the present and the future we must look for a solution of those physiological questions so necessary to successful practice in this department of our profession.

Mr. Paget is a physiologist, and we are glad to see that he has made use of his store of knowledge in this department in these contributions to scientific surgery.

The first lecture of the course treats of nutrition, its nature, purpose, and conditions. The distinctions between growth and development are clearly and beautifully drawn. The renewal of structures by the removal of old and the formation of new particles, is illustrated by the manner in which the hair is reproduced. All the tissues are shown to have a definite length of life, after which they die, communicating that life, particle by particle, to a successor. In reference to this subject, our author says:

"I believe that we may assume an intimate analogy between the process of successive life and death, and life communicated to a successor, which is here shown, and that which is believed to maintain the ordinary nutrition of a part. It may be objected, indeed, that the death and casting out of the hair cannot be imitated in internal parts; but we are not without an example in which the absorption of a worn-out internal particle is exactly imitated in larger organs, at the end of their appointed period of life. I adduce the instance of the deciduous or milk-teeth.

"We trace each of these developed from its germ, and in the course of its development, seperating a portion of its capsule for the germ of its successor: then each, having gained its due per-

fection, retains for a time its perfect state, and still lives, though it does not grow. But at length, as the new tooth comes, the deciduous tooth dies, coincidently, not consequently; or rather, the crown of the old tooth dies, and is cast out like a dead hair; while its fang, with the bony sheathing, and the vascular and nervous pulp, degenerate, and are absorbed. It is here especially to be observed, that the degeneration is accompanied by some spontaneous transformation of the fang; for it could not be absorbed unless it were first so changed as to be soluble. And it is not degeneration, not death, which precedes its removal; for when a tooth-fang really dies, as that of the second tooth does in old age, then it is not absorbed, but is cast out entire as a dead part.

"Such, or nearly such, it is almost certain, is the process of nutrition everywhere: these may be taken as types of what occurs in other parts; for these are parts of complex organic structure and composition, and the teeth-pulps, which are absorbed as well as the fangs, are very vascular and sensitive; and, therefore, we may be nearly sure, are conformed to only the same laws as prevail in all equally organized parts.

"Nor are these the only instances that might be adduced. We see the like development, persistence for a time in the perfect state, death, and discharge, in all the varieties of cuticles, with which, also, we may connect the example of the gland cells; and in the epidermis we have, as in the teeth, an evidence of chemical change in the old cells, in the very different influence which acetic acid and potash exercise on them and on the younger cells, making these transparent, but leaving them scarcely changed.

"These things, then, seem to show that the ordinary course of each elementary organ in the body, after the attainment of its perfect state by development and growth, is to remain in that state for a time; then, independently of the death or decay of the whole body, and, at least in a great measure, independently of its own exercise or exposure to external violence, to die or to degenerate; and then, being cast out or absorbed, to make way for its successor.

"It appears, moreover, very probable that the length of life which each part is to enjoy is fixed and determinate, though, of course, in some degree subject to accidents, which may shorten it, as sickness may prevent death through mere old age; and subject to the expenditure of life in the exercise of function. I do not mean that we can assign, as it is popularly supposed we can, the time that all our parts will last; nor is it likely that all parts are made to last an equal time, and then to be changed. The bones, for instance, when once completely formed must last longer than the muscles and other softer tissues. But, when we see that

the life of certain parts is of determined length, whether they be used or not we may assume, from analogy, the same of nearly all.

"For instance, the deciduous human teeth have an appointed duration of life—not, indeed, exactly the same in all persons, yet, on the whole, fixed and determinate. So have the deciduous teeth of other animals And, in all those numerous instances of periodical moulting, of shedding of the antlers, of the entire desquamation of serpents, and of the change of plumage in birds, and of the hair in mammalia. What means all this, but that these organs live their severally appointed times, degenerate, die, are cast away, and in due time are replaced by others; which, in their turn, are to be developed to perfection, to live their life in the mature state, and to be cast off? We may discern the same laws of life in some elementary structures; for example, in the blood-corpuscles, of which a first set, formed from embryo-cells, disappear at a certain period in the life of the embryo, being replaced and superseded by a second set, formed from lymph-corpuscles And in these also we may see an example of the length of life of elemental parts being determined, in some measure, by their activity in function; for if the development of the tad-pole be retarded by keeping it in a cold, dark place, and if, in this condition, the function of the first set of blood-corpuscles be slowly and imperfectly discharged, they will remain unchanged for even many weeks longer than usual. Their individual life will be thus prolonged, and the development of the corpuscles of the second set will be for the same time postponed.*

"The force of these facts is increased by the consideration of the exact analogy, the almost identity, of the processes of secretion and nutrition; for in no instance is the fact of this limited life of individual parts more clearly shown than in the gland-cells, by which periodical secretions are elaborated. The connecting link between such gland-cells and the most highly-organized parts, as well as a manifest instance of determinate length of life and natural death, is found in the history of the ova. These attain their maturity in fixed successive periods of days: they are separated (as the materials of secretions are) while yet living, and with a marvellous capacity of development, if only they be impregnated during the few days of life that remain to them after separation; but if these days pass, and impregnation is not effected, they die, and are cast out as impotent as the mere epithelial cell.

"Now, from these cases it is not by a far-fetched analogy that we assume the like mortality in all other tissues, and that this is the principal source of impairment, and of change for the worse,

* See Kirke's Physiology, pp 65 and 290.

which every part of the body has within itself, even in the most perfect state, and in the conditions most favorable to life. And I may anticipate a future subject of consideration, by saying that the application of these truths is of some importance in practical pathology: inasmuch as the results of this degeneration of parts, at the close of their natural term of life, may be mingled with the effects of all the morbid processes by which the natural nutrition of a part is hindered or perverted. Hence, at least in part, the long continuing or permanent loss of power in an organ (say a muscle) which has been disused, or has been the seat of inflammation. This loss is not wholly due to a primary disease of the fibre: in part, it is because the inflammatory process and the organization of the morbid exudation exclude the ordinary process of nutrition: and the muscular fibres, which now, in the ordinary course of life, degenerate, are not replaced, or are imperfectly repaired."

The whole lecture is full of interest; but we have not space for further extract. The conditions necessary to the normal nutrition of parts are discussed, namely—

1st. A right state of composition of the blood.

2d. A regular and not far distant supply.

3d. In most instances, at least, a certain influence of the nervous system.

4th. A natural state of the part to be maintained.

By a right state of the blood, our author means that which is appropriate for the nourishment of the tissues at any given period in life, and not an absolute standard at each moment of our lives, the change going on in the organism gives rise to a change in the constitution of the blood. The growth of different structures, and the performance of the function of different organs, all modify it more or less.

From youth to age, therefore, through every hour of our being, this fluid differs, and the "right state" yesterday is not the right state to-day, nor will it be to-morrow. Each part, as it grows, abstracts a position from the circulating pabulum, returning to its elements, which have already subserved their purpose.

In Lecture Second, which treats of the conditions necessary to healthy nutrition, our author puts forth the bold proposition that each individual part, in its growth, abstracting from the blood those substances peculiar to itself, so far as every other tissue is

concerned, a true excretion. The existence of rudimental organs as hair on the human fœtus, the mammary glands in the male &c., is accounted for on this principle. In their growth they serve the purpose of excreting organs, separating from the blood those substances which are rejected by every other structure. This idea will be better understood from the following extract:

"For these rudimental organs certainly do not serve, in a lower degree, the same purposes as are served by the homologous parts, which are completely developed in other species, or in the other sex. To say they are useless is contrary to all we know of the absolute perfection and all-pervading purpose of creation; to say they exist, merely for the sake of conformity, with a general type of structure, seems unphilosophical, while the law of the unity of organic types is, in larger instances, not observed, except when its observance contributes to the advantage of the individual. Rather, all these rudimental organs must, as they grow, be as excretions, serving a definite purpose in the economy by removing their appropriate materials from the blood, and leaving it fitter for the nutrition of other parts, or by adjusting the balance, which might else be disturbed by the formation of some other part. Thus they minister to the self-interest of the individual, while, as if for the sake of wonder, beauty, and perfect order, they are conformed with the great law of the unity of organic types, and concur with the universal plan observed in the construction of organic beings.

"And again—the principle that each organ, while it nourishes itself, serves the purpose of an excretion, has an application of peculiar interest in the history of development. For if it be the influential when all the organs are already formed, and are only growing or maintaining themselves, much more will it be so when the several organs are successively forming. At this time, as each nascent organ takes from the nutritive material its appropriate constituents, it will co-operate with the gradual self-development of the blood, to induce it in that condition which is essential, or more favorable, for the formation of the organs next in order to be developed."

Our author goes on to show that the existence in the blood of certain matters determines the formation of corresponding tissues. This is especially true of the lowly organized tissues.

These principles are applied to individual instances. "They suggest," says our author, that certain stand in their nutrition in a complemental relation to each other; so that neither of them

can be duly formed or maintained in healthy structure, unless the right condition of the blood be induced and maintained by the formation of the other."

Not only so, but we may also believe, more particularly, "that certain organs are, mutually, as excretions from each other." This beautiful thought is in harmony with what we know of the economy of nature, and if true, as we believe it is, it possesses a practical value in the study of the pathology of the blood.

The subjects of formative process, growth, hypertrophy, atrophy, are discussed in a masterly style, and with the spirit of a true physiologist.

Lectures 7th, 8th, 9th, 10th, 11th and 12th treat of the repair and reproduction of injured and lost parts.

Inflammation and its attending phenomena and results occupy Lectures 13, 14, 15, 16, 17, 18 and 19. Lecture 21st is devoted to the consideration of specific diseases.

The larger portion of the work is devoted to the investigation of tumors, while the closing lecture treats of tubercle.

We have only room for a few extracts from that portion of the work devoted to the classification of tumors. Our author recognized the distinctions of malignant and non-malignant tumors. In addition to the general definition of tumors, which is as follows: parts which, 1st, are isolated from the surrounding parts by distinct investing layers of tissue; 2dly, though continuous with, the natural parts are abruptly circumscribed in the greater part of their extent; or, thirdly, are formed of new materials, infiltrated and growing in the interstices of natural parts. The following are given as characteristics of malignant growths:

"And, first, the intimate structure of malignant tumors is, usually, not like that of any of the fully developed natural parts of the body, nor like that which is formed in a natural process of repair or degeneration.

"Many of the cells of cancers, for example, may be somewhat like gland-cells, or like epithelium-cells; yet a practised eye can distinguish them, even singly. And much more plainly their grouping distinguishes them: they are heaped together disorderly, and seldom have any lobular or liminar arrangement, such as exists in the natural glands and epithelia, or in the innocent

glandular or epithelial or epidermal tumors. These innocent tumors are really imitations, so far as their structure is concerned, of the natural parts: and the existence of such imitations in any tumors make the diversity—the heterology, as it is called—of the malignant tumors, appear more evident

"Secondly, malignant growths may have the character of infiltration—*i. e.* their elementary structures may be inserted, infiltrated, or diffused in the interspaces and cavities in which they lie. Thus, in its early state a malignant tumor may comprise, with its own proper elements, those of the organ in which it is formed; and it is only in its later life that the elements of the tissue disappear from it, gradually degenerating, and being absorbed, or, possibly, yielding themselves as materials for its growth.

"3d. It is also generally characteristic of malignant tumors that they have a peculiar tendency to ulcerate, their ulceration being commonly preceded by softening. One can, indeed, in this particular, only observe a graduated difference between the innocent and the malignant diseases; for certain innocent tumors, if they grow very rapidly, are apt very rapidly to decay; and they may suppurate and discharge their ichor and debris with foul and dangerous ulceration. Thus the quickly-growing cartilaginous tumors may imitate, in these respects, malignant growths; so may large fibrous tumors when they soften and decay. Or, again, when an innocent tumor grows more rapidly than the parts over it can yield, they may waste and ulcerate, and allow it to protrude; and it may now itself ulcerate and look very malignant disease. This may be seen in the protruding fibrous tumors that ulcerate and bleed; or, in a more striking manner, in the protruding vascular growths that have sprung up in the cystic tumors of the breast. Or, once more, the characters of readiness to ulcerate may be imitated by innocent tumors after injuries, or in exposure to continued irritation; for they resist these things with less force than the similar natural parts do. Hence, sloughing and ulcerating fibrous, erectile, and other tumors have been often thought cancerous, and so described.

"The respective tendencies to ulcerate can, therefore be counted only as constituting differences of degree between the innocent and the malignant tumors. We may speak of a liability in the one case, of a proneness in the other.

"4th. The softening that often precedes the ulceration of malignant growths can hardly be considered separately from the minute account of their structure. I therefo e pass it by, and proceed to their fourth distinctive character, which is to be noticed in the modes of their ulceration.

"This is, that the ulcer which forms in, or succeeds a malig-

nant growth, has no apparent disposition to heal; but a morbid substance, like that of which the original growth was composed, forms the walls or boundaries of the ulcer: and as this substance passes through the same process of ulceration which the primary growth passes through, so the malignant ulcer spreads and makes its way through tissues of all kinds.

"5th. Malignant tumors are, again, characterized by this: that they not only enlarge, but apparently multiply or propagate themselves; so that, after one has existed for some time, or has been extirpated, others like it grow, either in widening round its seat, or in parts more remote.

"8th. A sixth distinctive character of malignant tumors is, that, in their multiplication, as well as in their progress of ulceration, there is scarcely a tissue or an organ which they may not invade."

The physiology, as well as the anatomy of tumors claims a large share of the author's attention, and gives to the work its distinctive character.

We have seldom seen a book the perusal of which has given us so much pleasure, and we unhesitatingly recommend it to all who are interested in the application of physiology and surgical pathology.

For sale by D. B. Cooke & Co., 135 Lake st., Chicago.

J.

Public Address on the Intellectual, Moral, and Physical Training necessary to constitute the True Physician. Delivered before the Æsculapian Medical Society, at its Semi-Annual Session, held in Marshall, Illinois, May, 1854. By F. R. PAYNE, M.D. Published by order of the Society.

OUR readers are indebted to the Æsculapian Medical Society for many very interesting articles which have appeared from time to time in this journal. The address of Dr. Payne is only another evidence of the industry and ability of our professional brethren in that section of our state. We have neither space for extracts, nor time for analysis. We thank the Doctor for the happy manner in which he has treated his subject, and solicit for our readers and ourselves the privilege of frequently hearing from him through the pages of our journal. J.

Tableau of the Yellow Fever of 1853, *with Topographical, Chronological, and Historical Sketches of the Epidemics in New Orleans since their origin in* 1796; *illustrative of the Quarantine Question.* By BENNET DOWLER, M.D. New Orleans. 1854.

THIS is a graphic little work, of 66 pages, and embraces apparently all that is known of the history of yellow fever in New Orleans for the last fifty-eight years. We have neither time nor space to do more than assure our readers that it is marked by the industry and ability characterizing all the productions of its distinguished author. It is truly a valuable acquisition to the literature of epidemics. J.

On the Reputed Causes of Yellow Fever and the so called Sanitary Measures of the Day, by M. MORTON DOWLER, M.D., Fourth District, New Orleans.

THIS is the title of a pamphlet of 20 pages reprinted from the New Orleans Medical Journal. Dr. Dowler's object is to show:

First, that the first cases of yellow fever in 1853 occurred in a portion of the city entirely cut off from the shipping, and several days before any cases had been discovered on board of any of the ships in port.

Secondly, that the first cases had not been contracted by contact with persons laboring under yellow fever.

Thirdly, that the disease was not communicated by these first cases to any other person.

Our author battles against the theory that filth is the producing cause. He shows that those parts of the city containing the largest quantities of decaying vegetable and animal matter did not suffer more than those where the most scrupulous regard was paid to cleanliness. In addition to the facts adduced the following argument is given:

"In fact, the filth theory is wholly untenable, not only from the entire history of yellow fever in this community, but from every analogy known to science. Every product, whether solid, fluid, or aeriform, or imponderable, whether resulting in the decomposition of animal, vegetable, or mineral matter, produces effects which are remarkably uniform. They do not discriminate between

the acclimated and the unacclimated, nor are their noxious or innocuous properties at all modified by such circumstances. For instance the deposits at Gormly's Basin give off amongst other substances, sulphuretted, carburetted. and phosphoretted hydrogen, ammoniacal gases, substances which with ordinary ventilation merely give evidence of their existence by offending the nostrils, in bad ventilation become oppressive, and when highly concentrated quickly destroy life. The effects are uniform in all climates, and to assume that the mere enhaling of a mixed atmosphere, which one person breathes with perfect impunity, should give another the yellow fever, another the cholera. and a third the typhus fever, it is simply a *reductio ad absurdum*. Our knowledge of these gases demonstrates that the reputed cause is insufficient to produce the effect, and there is not a shadow of proof to show that it does produce it. The exhalation from departed animal and vegetable life mingle with our every breath, and it has never been shown, nor ever can be shown that they act otherwise than uniformly. Touching the filth question, let us not be misunderstood. Let every alderman "search the scriptures." There is scarcely a chapter in that sacred book which does not admonish all to "wash and be clean." Common decency also speaks aloud. False and improbable theories, however, can do nothing else than lead to useless and extravagant and corrupt legislation, and to lull the public into a false security.

J.

EDITORIAL.

Progress of Cholera.

In the July No. of the Journal, we noted the progress of Cholera and Dysentery in this city up to the 31st of that month. Since that time the Cholera has altogether ceased as an *epidemic*, as the following tabular statement will show:

		CHOLERA.	ALL DISEASES.
August	1,	16	33
"	2,	12	34
"	3,	10	27
"	4,	10	22
"	5,	15	26
"	6,	9	25
"	7,	16	28
"	8,	14	29
"	9,	15	22
"	10,	13	27
"	11,	5	21
"	12,	5	21
"	13,	11	22
"	14,	8	14
"	15,	7	15
"	16,	9	30
"	17,	1	11
"	18,	4	28
"	19,	3	14
"	20,	2	10
"	21,	5	16
"	22,	9	35
"	23,	5	29
"	24,	5	18
"	25,	8	22

This gives a total of 212 deaths from Cholera in 25 days, and a total of 574 from all diseases during the same time; being only little more than one-half of the mortality which took place during the preceding month. During the first week in August the weather continued warm, with a moist atmosphere. From the 6th to the 10th it was cool and dry. Some rain fell on the 11th, and the 12th was very sultry and warm. From the 13th to the 17th it was uniformly clear, dry, and moderately warm. On the 18th there was a slight fall of rain; but from the 19th to the 25th it was uniformly clear, dry, and very warm; the mercury generally rising in the middle of the day to 98 and 100 degrees Fah. During this time, too, the wind was uniformly from the south or south-west. On the evening of the 25th, we had a copious shower of rain, and the wind changed to the north. By comparing these statements in reference to the weather with the table of daily mortality, it will be seen that they bear the same relation essentially as that pointed out in our previous notices. We may now safely consider the prevalence of cholera in this city at an end for this season. Sporadic cases may continue to occur for a few weeks longer, but even these will be limited to immigrants and intemperate residents chiefly. Within a few weeks past, we have had several letters, asking our method of treating cholera. None of these letters have been answered for two reasons: First, they reached us at a time when sickness was unusually prevalent in the city, leaving us not one moment of leisure from day-light to day-light again. Second, it is impossible in one brief letter to give any adequate idea of the treatment of such a disease as cholera is in its various stages. Neither have we time or space now to do more than give a brief outline of our views. We believe cholera to consist essentially in a great diminution of organic susceptibility throughout the whole capillary system, coupled with a peculiar irritability of the mucous membranes. The first leads more or less rapidly to a suspension of capillary circulation, and consequently to diminished or suspended secretion and production of animal heat. The second is manifested in the violent vomiting and purging during the active stage of the disease. These views point distinctly to *three* leading therapeutic indications, viz.: First,

to soothe the irritation of the mucous surfaces. Second, to improve the organic susceptibility and tonicity of the whole system; and third to restore the secretions of the more important organs and replenish the blood. In the first or premonitory stage of the disease, the prompt fulfilment of the two first indications is all that is required. For this purpose I have found nothing better than some one of the following formula, viz.:

℞ Chloride of Sodium - - - - ℥ij
Tinct. Opii - - - - - ℥ij
Water - - - - - - ℥ij

Mix and give one tea-spoonfull every 2, 3, or 4 hours until the bowels become natural.

℞ Aromatic Sulph. Acid - - ℥j
Sulph. of Quinine - - 10 grs
Sulph. of Morph. - - - 5 grs

Mix—give 15 or 20 drops every 4 or 6 hours in sweetened water. If in addition to either of the above remedies, we give each morning and evening a powder composed of Sub. Murias. Hydrarg. 2grs. and Pulv. Opii from half a grain to one grain, it will seldom fail in two days not only to remove the premonitory symptoms of cholera, but also invigorate the system. and remove the tendency of relapse. If more active serous or cholera diarrhoea has commenced, and yet without vomiting or cramps, we give the following powder every one or two hours until the discharges entirely cease, viz:

℞ Sub. Murias Hydrarg from 2 to 4 grs.
Acetas Plumbi from 1 to 2 grs
Pulv. Opii from ½ to 2 grs. mixed.

At the same time keep the patient entirely at rest and give for nourishment sweet milk boiled with a little flour, or chicken tea well salted. After the bowels have been kept quiet from 18 to 24 hours, we usually give the following viz.:

℞ Tinct. Cinchonae - ℥ij
Aromat. Syrup Rhei - ℥j

Mix and give a tea-spoonful every 4 or 6 hours, until the bowels become regular. Sometimes it is necessary to add Tinct. Opii et Camp. ℥j. to the last prescription. In the second or active stage of cholera, when vomiting and purging, and cramps have

fairly commenced, we give one of the powders of Calomel, Opium and Acetate of lead, named above, immediately after every turn of vomiting, whether it be once in five minutes or once an hour. At the same time we direct an Enema consisting of half a tea-cupful of thin starch and 10 grs. of Acetate of lead with a tea-spoonful of Laudanum, to be thrown into the rectum immediately after each evacuation of the bowels. We cover the epigastric region and central part of the spine with a strong mustard plaster, and persuade the patient if possible to lie still with the lower extremities covered. We satisfy the craving for drink as much as possible with small pieces of ice, and allow every half hour a wine-glass ful lof a weak solution of salt. Such are the chief means with which we combat cholera in its active stage; and quite as much depends on the *manner* of using them as on the means themselves. For instance, if we prescribe a powder to be given every half hour or hour, or if we wait, as is often done, a few minutes after each turn of vomiting "*for the stomach to get settled*," the few minutes we wait is often just sufficient to have the stomach prepared for another paroxysm of vomiting; and of course the medicine is immediately rejected. But the same medicine given *immediately* after the stomach has exhausted itself will be retained long enough to *gain* some effect. The same rule is equally important in reference to enemas. In a great majority of cases the skillful application of the foregoing means, commenced in the early part of the active stage will promptly control the disease. If the active stage is more advanced, the tongue and lips cold; the pulse feeble; the voice husky, &c., we add to the above remedies one or two table-spoonfulls of chicken or beef tea thoroughly salted every 30 minutes, attended with the same quantity of strong coffee. At the same time we lessen the quantity, or entirely exclude the Opium from the powders and supply its place with from 2 to 4 grs. of Quinine.

If the patient passes into entire *collapse*, we trust chiefly to the following drinks, and entire quiet, viz.: strong infusion of coffee, two parts; sweet milk, one part; given in doses of one, two, or three fluid ounces every half hour; and between each dose the same quantity of chicken or beef tea, nearly saturated

with common salt In this stage, the fluids of the system having become exhausted, the object is, to husband what vitality remains by rest, and the restoration of the materials previously lost from the blood and tissues, in such doses as the stomach will bear. Such is a very brief outline of our treatment of this formidable disease. It is true that we often use remedies not mentioned here. We have bled some patients, cupped others, put some in the warm bath, others in the cold bath, or wet sheets. To some we have given salt and mustard; to others salt, calomel, and quinine. Sometimes we have given a large dose of calomel; sometimes nothing but very small doses, repeated every five minutes These have been variations to meet special indications in particular cases. To point out such special indications, &c., would require all the space there is in the present journal, and far more time than we have at command. We have given the foregoing brief outline of treatment, not from any special confidence in its importance, but to gratify our correspondents as far as possible. It will be seen that we have made no mention of brandy, cayenne pepper, carb. ammonia, ether, &c., simply because we do not use them. We have done active service through *five* cholera seasons (one in New York city and four in Chicago), and during the whole time we have not given internally *one drachm* of cayenne pepper, or *one pint* of any kind of alcoholic drink Still we have had abundant opportunities for observing the effects of both, and are satisfied that the first only irritates the sensitive surface of the stomach, and the last renders the blood more carbonaceous, and less capable of sustaining the organic actions and vital properties than without it. D.

Vaccine Virus.—We are frequently called upon by our friends from a distance for vaccine virus, but are not always able to furnish it. It will be an accommodation to many, perhaps, to know that it can be obtained of E. L. O'Hara, Druggist, No. 24 West Randolph st., Chicago.

The packages are sent by mail for $1 each. J.

OBITUARY.

Died, in Perry, Illinois, July 11, 1854, of consumption, ISAAC NEWTON DAVIS, M.D., aged 26 years.

Dr. Davis was a graduate of Rush Medical College, and during his residence in this city had won for himself the confidence and esteem of all who knew him.

His good natural talents were cultivated by close observation and careful reading, while his heart was deeply imbued with the spirit of kindness and Christian Charity.

We knew him well, and as we watched his patience under suffering, and the fortitude and even cheerfulness with which he pursued the rugged paths of our science, conscious, meanwhile, that the slow destroyer was on his track, we learned to love him.

Modest and retiring in his manners, thorough in investigation, cool in judgment, and prompt in execution, with a warm heart and generous sympathies, he possessed those qualities eminently fitting him for the practice of the profession which he had chosen. While we sympathize with his afflicted friends, we recognise in his early death a loss to our profession and to science.

J.

Died, in Boston, July 1st, Dr. WALDO J. BURNETT, aged 26 years.

Dr. Burnett had won for himself an enviable reputation as a naturalist and physiologist. Although young in years, he had accomplished much for his profession and for natural history.

The Transactions of the American Association for the Advancement of Science have been enriched by several contributions from his pen. The principal work, however of his life was the essay published in the last volume of the Transactions of the American Medical Association, on "The Cell; its Physiology and Pathology."

It would seem hard that one so young and so gifted should die just as he was beginning to reap the reward of his labors, did we not believe that his active mind has found new and richer fields to explore, and that his heart, so full of love for nature, is already exulting in the apprehension of sublimer truths of the spirit-land.

J.